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Review

Gestational Diabetes Screening: New Criteria and Clinical Management - A Brief Review

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ABSTRACT

Gestational diabetes mellitus (GDM) screening has evolved over recent decades to enable early identification and appropriate management of this metabolic disorder affecting pregnant women worldwide. Traditionally, a two-step protocol is employed: a 50 g oral glucose challenge test (OGCT) followed, if positive, by a 100 g oral glucose tolerance test (OGTT) using Carpenter and Coustan criteria. However, the International Association of Diabetes and Pregnancy Study Groups (IADPSG) recommends a one-step approach with a 75 g OGTT, establishing thresholds based on maternal–fetal risk data from the HAPO Study. Adoption of the one-step criterion by the American Diabetes Association (ADA) and the World Health Organization (WHO) has increased the diagnosed prevalence of GDM, fueling debate over cost-effectiveness and perinatal outcomes. In Brazil, both the Ministry of Health and the Brazilian Diabetes Society endorse universal screening between 24- and 28-weeks' gestation-using either protocol according to local resources. Clinical management combines nonpharmacological interventions (balanced hypocaloric diet and moderate exercise) with pharmacotherapy, beginning with adjusted insulin regimens and, when indicated, metformin or gliclazide. Rigorous capillary blood-glucose monitoring and ultrasound surveillance further ensure glycemic control and appropriate fetal growth. Despite demonstrated benefits, controversies persist regarding the optimal protocol for specific populations, especially in resource-limited settings. This review examines the new diagnostic criteria for GDM and discusses current clinical management strategies, emphasizing recent evidence and specialty-society recommendations.

Keywords: Gestational diabetes mellitus; Screening; Diagnostic criteria; Clinical management; Prenatal care

Introduction

Gestational diabetes mellitus (GDM) is defined as any degree of glucose intolerance first recognized in the second or third trimester of pregnancy, without excluding preexisting diabetes. Its prevalence ranges from 5 % to 18 % of pregnancies, depending on diagnostic criteria, ethnicity and population characteristics. GDM is associated with maternal complications such as preeclampsia, increased cesarean delivery rates and future type 2 diabetes risk and adverse neonatal outcomes

including macrosomia, neonatal hypoglycemia, jaundice and respiratory morbidity[1,2]. Effective screening is therefore essential to reduce both health risks and care costs. Historically, Carpenter and Coustan's two-step strategy (1992) uses a single 50 g OGCT threshold of 135–140 mg/dL, followed by a 100 g OGTT with three blood samples; GDM is diagnosed if two or more values are elevated. While widely accepted, this method presents logistical challenges, fasting requirements for the second test and variable sensitivity and specificity. The multicenter prospective HAPO Study correlated 75 g OGTT glucose levels with adverse outcomes, supporting new cutoff values to optimize maternal–fetal risk prediction.

In 2011, the ADA incorporated IADPSG recommendations for a one-step 75 g OGTT after overnight fasting, diagnosing GDM if any of these plasma glucose levels are met or exceeded: fasting ≥ 92 mg/dL, 1 hour ≥ 180 mg/dL or 2 hours ≥ 153 mg/dL[1]. The WHO endorsed a similar approach in 2013 to harmonize global criteria[3]. However, one-step adoption has increased GDM prevalence by up to 50 % compared to the two-step method[4], sparking debate on balancing early detection with health-system burden[5].

Objectives

To synthesize emerging diagnostic criteria and GDM screening protocols and to discuss the latest clinical management approaches, including cost-effectiveness, treatment adherence and maternal–infant outcomes.

Materials and Methods

A comprehensive literature review was conducted using PubMed, SciELO, Google Scholar and ScienceDirect to identify relevant studies and guidelines on GDM screening and management.

Discussion

The one-step 75 g OGTT criterion demonstrates greater sensitivity for GDM detection compared with the two-step protocol. Nguyen, et al. reported a 12 % increase in diagnosed GDM cases when using the one-step method[4], thereby identifying moderate-risk women who might otherwise be missed. Early diagnosis facilitates prompt intervention, potentially reducing complications such as macrosomia and preeclampsia[6]. However, higher sensitivity comes at the expense of specificity, leading to more false positives and increased laboratory and outpatient demands[5]. Cost-effectiveness remains central to protocol selection. Porter and Greenleaf found that despite higher initial screening costs with universal one-step testing, reductions in neonatal complications offset some expenses especially in high-volume settings. In resource-constrained regions (e.g., parts of Brazil's Northeast), the two-step strategy may still be more practical, lowering direct testing costs without substantially affecting outcomes[7]. Some centres propose isolated fasting plasma glucose testing for low-risk populations to simplify screening; while fasting glucose offers high specificity, its lower sensitivity risks underdiagnosis and is recommended only when full OGTT is not feasible[8,9].

Clinical management consensus emphasizes stringent glycaemic control. Nonpharmacological measures moderate caloric restriction, individualized nutritional counselling and regular physical activity are first-line, as they enhance insulin sensitivity and support healthy gestational weight gain. Insulin remains the gold standard when targets are unmet, given its efficacy, lack of placental transfer and extensive safety data. Oral agents such as metformin have gained interest for lower cost and reduced maternal weight gain, but long-term fetal safety data remain limited[10].

Multidisciplinary teams including obstetricians, endocrinologists, dietitians and nurses improve treatment adherence and perinatal outcomes[2]. Telemedicine programs for remote glucose monitoring have shown promise in maintaining target glycemia and increasing patient satisfaction[4]. Postpartum follow-up is crucial, as women with GDM face substantially higher risk of type 2 diabetes. NIH guidelines recommend re-evaluation with OGTT at 6–12 weeks postpartum and annual monitoring thereafter, emphasizing primary prevention strategies[11].

Conclusion

One-step 75 g OGTT criteria enhance sensitivity for GDM diagnosis, enabling earlier intervention that may reduce maternal–fetal complications. However, increased diagnostic prevalence imposes logistical and financial challenges, particularly in limited-resource settings. Protocol selection should balance population characteristics, infrastructure availability and associated costs, with the two-step strategy remaining appropriate in certain contexts[9,7]. Clinical management combining lifestyle modifications and insulin therapy represents the standard of care. Oral alternatives such as metformin may be considered selectively, with rigorous monitoring and discussion of long-term risks[10]. Multidisciplinary care teams and telemedicine are promising for optimizing adherence and outcomes. Postpartum surveillance is essential for preventing type 2 diabetes, including OGTT and regular follow-up per NIH recommendations[11]. Future research should assess the impact of regionally adapted screening protocols and evaluate safety and efficacy of emerging pharmacological and continuous-glucose-monitoring technologies.

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